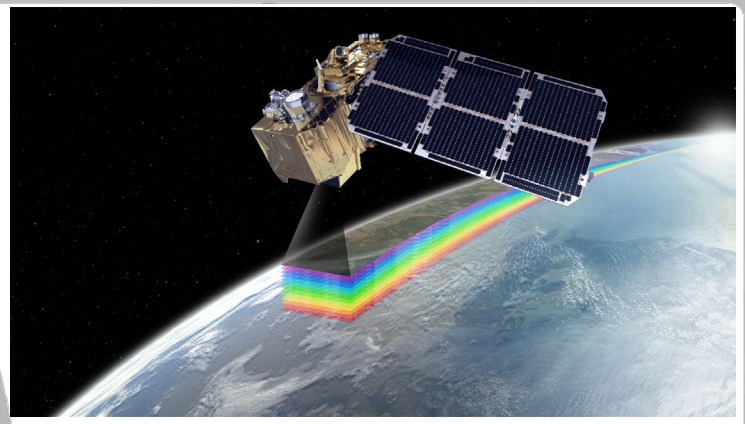
DEVELOPMENT OF A SATELLITE-BASED DISTRICT TOOL FOR QUANTIFYING COASTAL EVOLUTION AND PROJECT PERFORMANCE AT BEACHES AND INLETS

NAME OF WORK UNIT



PI's

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District PDT Members

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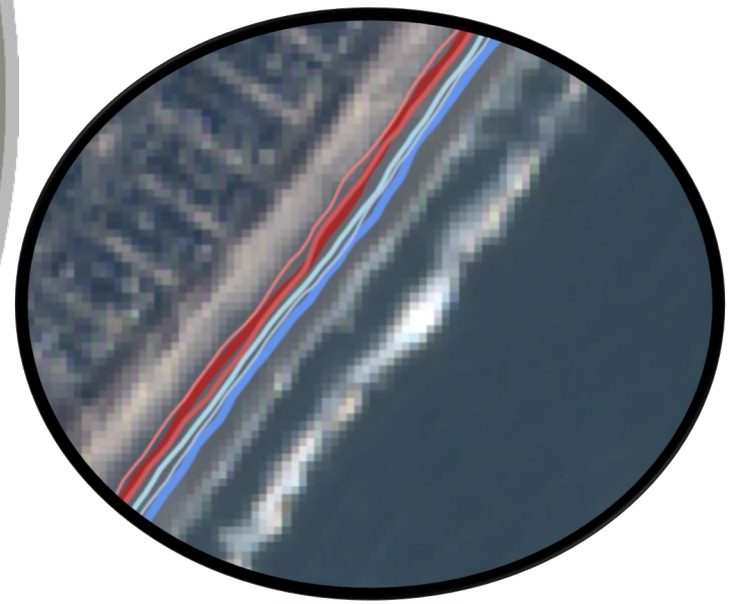
COASTAL INLETS RESEARCH PROGRAM

FY21 IN PROGRESS REVIEW



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CIRP: Mission Support, Technology Transfer, Research & Development

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CHL COASTAL & HYDRAULICS LABORATORY

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Problem Statement

- **Existing coastal survey methods are often time-consuming and expensive**
  - **to conserve limited operational resources (e.g., personnel and vessels), USACE Districts are often forced to narrow areas of interest or monitoring frequency, decreasing the likelihood of making data-driven management decisions**

SoN
- Satellite Imagery for Coastal Monitoring (1731)

Capability and Strategic Impact Statement

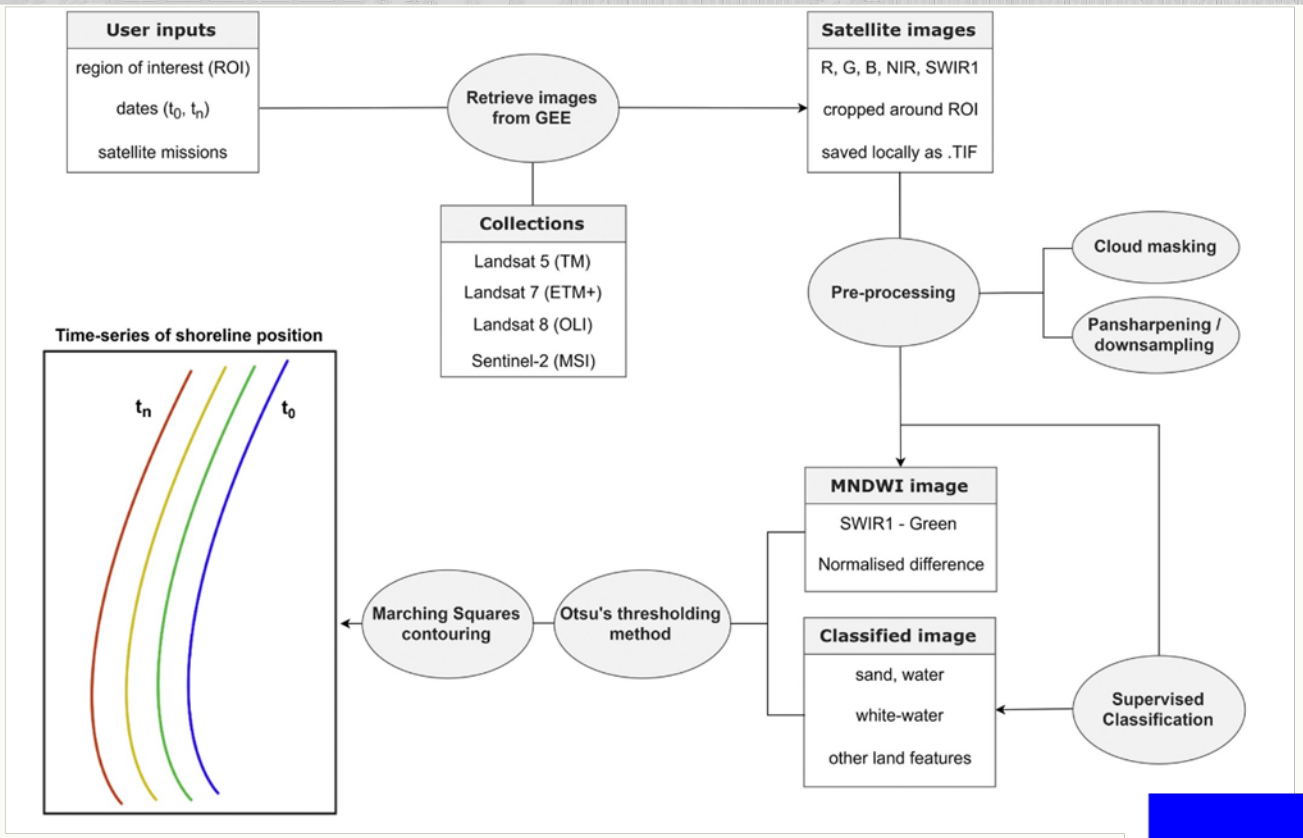
Satellite-based tool is expected to provide USACE Districts access to a new data source, enabling wide-spread frequent coastal data with low cost and personnel commitment.

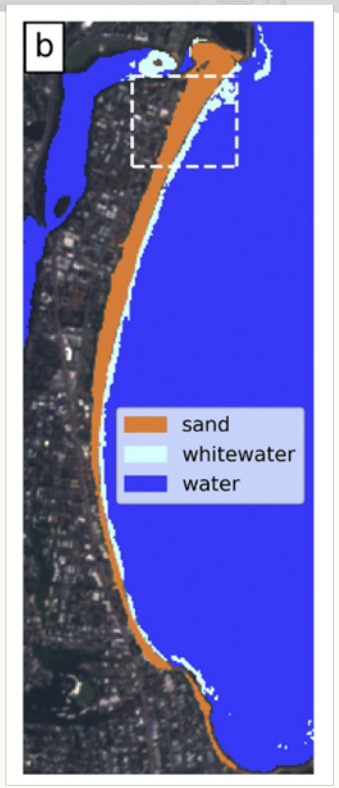
Adds ability to examine shoreline variability (short and long term) and help with preliminary planning for districts managing beach projects or inlets (e.g., nourishments, nearshore berms, dredging, etc.)

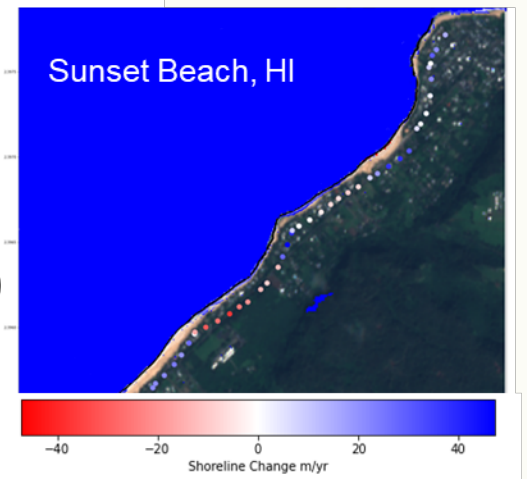
Approach

Technical Advancements:

- Improved image sorting code
- Tide station and correction code
- CoastSat output post-processing: shift output shorelines based on slope + tide
- CoastSat output post-processing: removal of onshore artifacts
- Shoreline comparison preliminary code
  - Lidar point cloud automated shoreline contour code
- CoastSat version updates







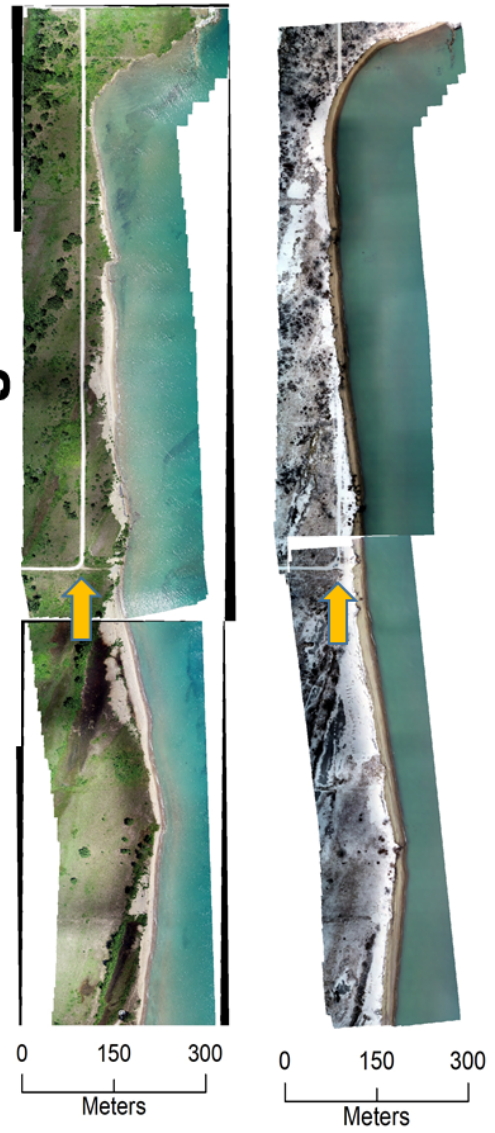
Site Selection

20 year runs for >270 km

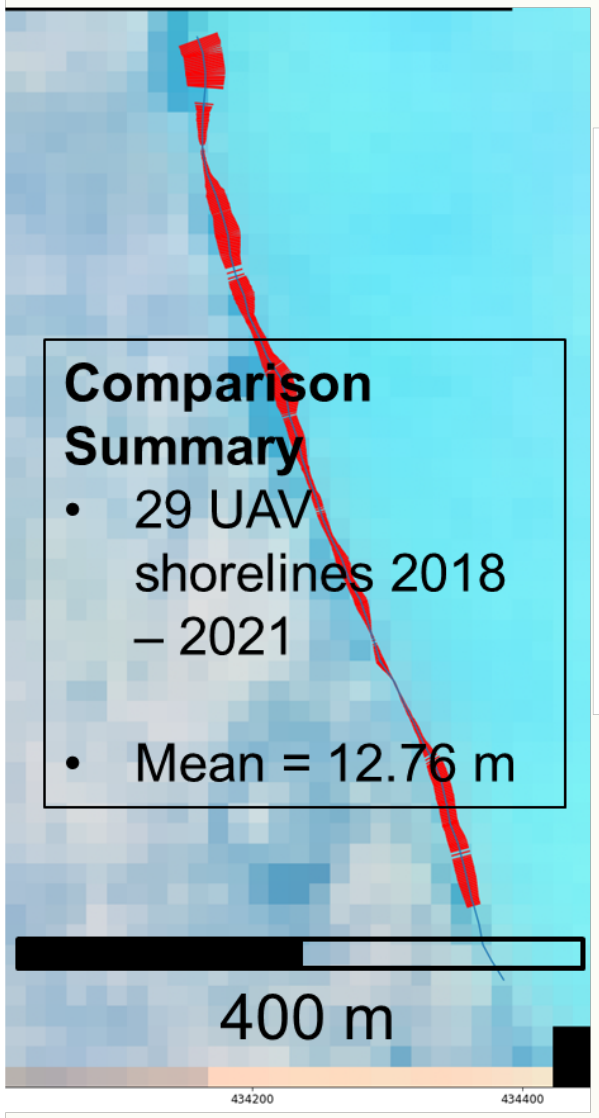
Instantaneous Shoreline Comparisons

Lake Michigan

7/24/2018 1/6/2021

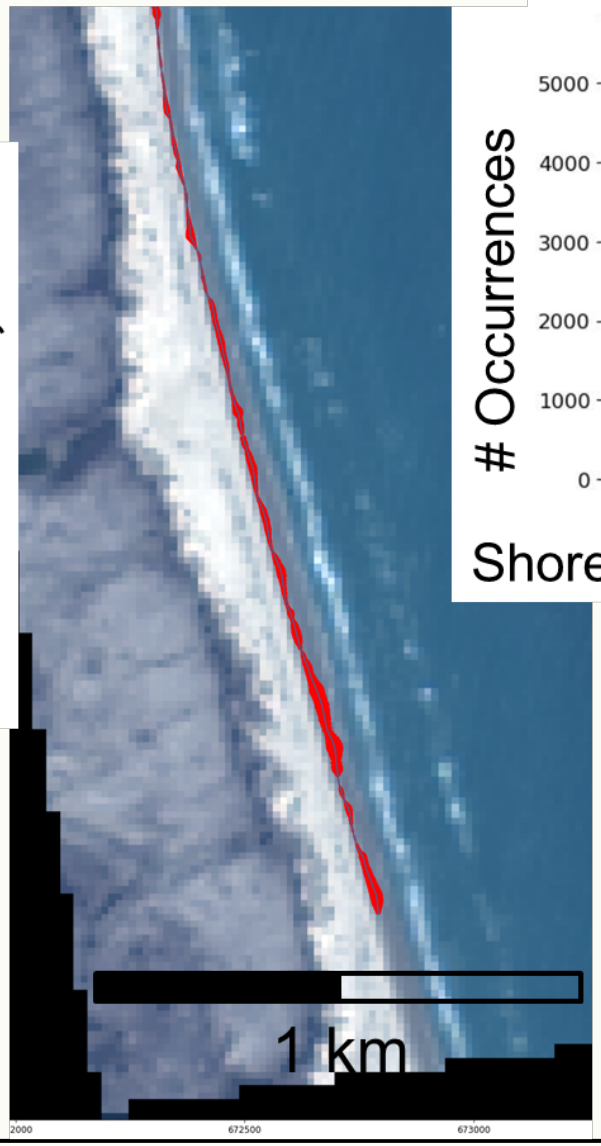


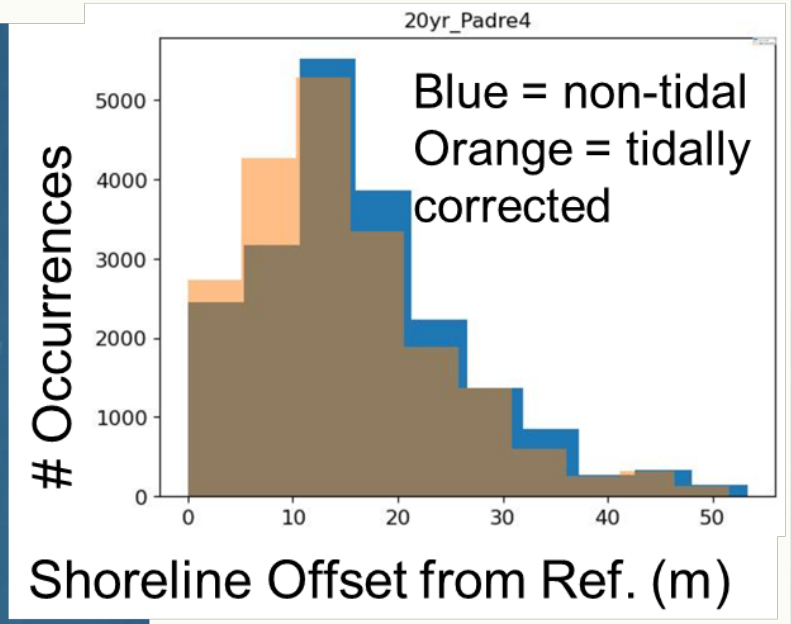
CoastSat



South Padre, TX

CoastSat





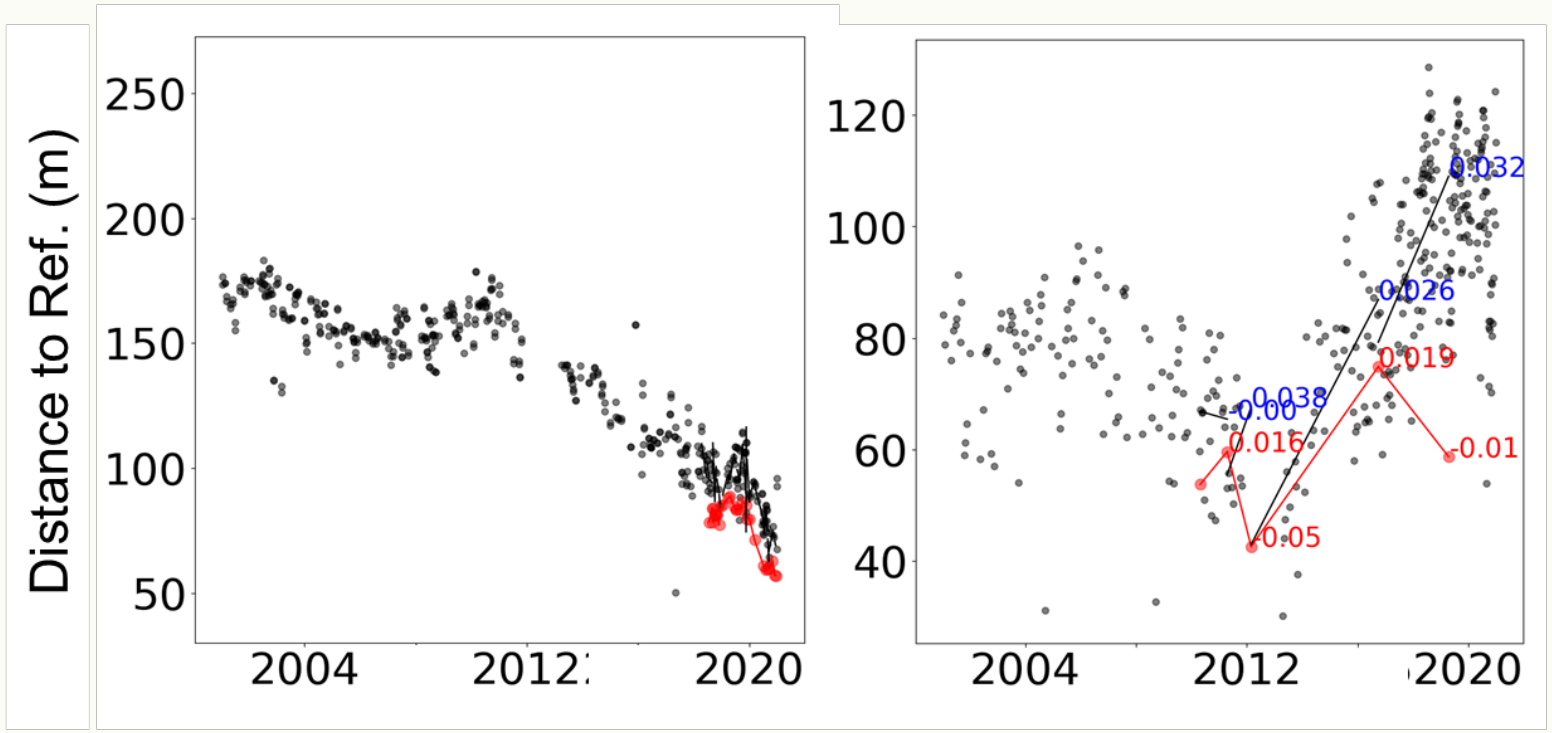
Comparison Summary

- 2010, 2011, 2012 2016 and 2019 lidar shorelines
- Mean = 7.13 m

Shoreline Trend Comparisons

Lake Michigan

South Padre, TX



New Smyrna Beach, FL

Summary

FY21 Major Advances in Capability

- 20 year runs at >270 km
- Improved image sorting code
- Tide station and correction code
- CoastSat output post-processing: shift output shorelines based on slope + tide
- Shoreline comparisons, trends and analysis

FY21 Major Products & Collaborations

- **Extensive District meetings/collaboration (sites)**
- **TR in progress**
- **Fall/Winter TD?**
- **Leveraging RAFTER 6.1, CODS (Mini Argus)**
- **District communication of other potential satellite use/products**

Planned Outyear Products/Advances

- **Wrap up shoreline comparison/trend analysis**
- **Submit TR**
- **Test other shore types (e.g., marsh)**
- **Tool development feedback**